2012 QuarkNet Activities at SCIPP/UC Santa Cruz

(A QuarkNet Center since inception)

1. Balloon Fest 2012

Our annual three-day workshop took place over the weekend of May 5th on the grounds of the Tobin James Cellars in Paso Robles, CA. UCSC/SCIPP Mentors Terry Schalk and Hartmut Sadrozinski led the workshop, while the planning, organization and much of the "leg work" was once again done by Master Teacher Steve Kliewer. Over 100 high school students from many different school districts, their teachers, and parents organized in 26 teams, participated in taking data with scientific balloons, analyzing the data, and presenting their results using power point slides and animations. The participation of the high school teachers, including Stuart Briber, Ty Fredriks, Alisa Bredensteiner, Mary Jo Nordyke, and Linda Bernhardt, was again very strong. The participation of additional UCSC/SCIPP faculty and researchers (Jason Nielsen and Alex Grillo), along with graduate students and former UCSC Physics students, demonstrates the strong commitment from SCIPP. Faculty and students volunteered their time as mentors, contacted the teams ahead of time to help with the planning of the experiments, and offered help and constructive criticism during the data taking and analysis. This was a great learning experience for everyone involved.

http://scipp.ucsc.edu/outreach/BF/balloon.html
Balloon Fest in the News:
http://calcoastnews.com/2012/05/baloon-fest-2012-event-photos/

2. QuarkNet Teacher Workshop

The Teacher Workshop, July 30 through August 3, brought four local high school teachers to the UC Santa Cruz campus. The teachers came from a wide variety of backgrounds and schools.

The first day was primarily orientation, with faculty mentor and SCIPP Director Steve Ritz providing a two-hour interactive discussion of the research at SCIPP and our outreach programs, and a long session with our QuarkNet veteran teacher and high school student program mentor Stu Briber. Professor Abraham Seiden spoke the first day about the discovery of a Higgs-like particle at CERN at a UCSC campus lecture, and the teachers then had a lunchtime Q&A with Abe all to themselves.

The next three days of the workshop were organized and led by QuarkNet Fellow Nathan Unterman. This was new for us, and what a great experience for our teachers, as they were led step-by-step through the assembly of a CRMD. QuarkNet National Staffperson Kris Whelan also added her expertise and perspectives to the workshop. The teachers designed their experiments, debugged their setups, analyzed data, discussed unit plans, and gave reports at the end in a lively session that brought together our QuarkNet students (see below) and teachers.

A very positive aspect of this year's teacher workshop was that, thanks to the efforts of the FNAL QN group, we had sufficient CRMDs. Another important point for the success of the workshop was the support by Stuart Briber, our Research Teacher Leader for the High School Students, who independently planned a no-host dinner with the teachers for

the evening of their first day, and also was available to advise or assist the teachers in their use of the CRMDs.

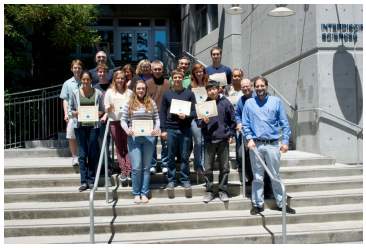
Following our usual practice at SCIPP, we had all teachers complete an evaluation, which we are using as valuable input to plan and further improve the curriculum for next year. An important lesson learned from this year's experience is the great value of starting early. Nominal dates for the 2013 workshop have already been chosen (15-19 July 2013), and we are sending out information to the email lists and contacts that were further developed for the 2012 workshop.
http://scipp.ucsc.edu/outreach/TW/teach2012.html

3. QuarkNet High School Internship

The High School Internship, July 9-August 3, brought an outstanding group of nine students from schools located in the Santa Cruz Area to work full time on the QuarkNet CRMDs. Research teacher Stuart Briber, who has been with the UCSC QuarkNet center for many years, led the students in their four-week program. Faculty member and SCIPP Director Steve Ritz served as faculty mentor.

An important feature of our program is the strong involvement of SCIPP faculty and researchers. Students heard presentations by, and had discussions with, the following UCSC/SCIPP faculty and staff about their research: Professor Ritz (Introduction to SCIPP and the Fermi Gamma-ray Space Telescope), Professor Seiden (Discovery of a new particle at the LHC), Professor Sher (Neuroproject), Professor Profumo (Dark Matter), Professor Atwood (Physics of Violin Making), Dr. Alex Grillo (Instrumentation and the LHC), Prof. Jeltema (High Energy Astrophysics), Prof. David Smith and Graduate student Nicole Kelley(Particle acceleration near lightning), Graduate Student Amy Furniss (Ground-based gamma-ray astrophysics), and Graduate student Omar Moreno (Heavy photon search). All the presenters spent considerable time developing presentations that engaged the students.

In addition to the standard QuarkNet assessments, we also used our own evaluation form, which we developed last year, for the students. We used last year's responses and experiences to make adjustments to this year's program, which was again very successful. Because of all the prior year's positive experiences, word of the program is spreading very effectively in area schools: our applicant pool this year was even stronger than last year. We decided, however, not to grow the program too quickly, and instead maintain excellence and a high level of individual attention. All students were fully engaged, and they developed creative uses for the CRMDs, solved problems as they arose, assessed experimental uncertainties, and completed their experiments and reports. Their presentations were carefully prepared and well executed. The students developed skills including how to think on their feet, critically assess their own results, and answer open-ended questions. They also developed a good team spirit, helping each other solve problems.



http://scipp.ucsc.edu/outreach/HS_Interns/2012_HS_Interns/home.htm